**South Dakota Agricultural Education (AFNR)**

**Academic Integration Activities**

**ACTIVITY #14**

*Agriscience students use alternative computation strategies to quickly find units of seed needs for a given field and seeding rate recommendation.*

1. **Ag Standard**

Agriscience, AS2.2: Demonstrate plant cultural procedures.

* Demonstrate proper seeding practices.

1. **Academic Standard**

9-12.N.3.2: Students are able to select alternative computational strategies and explain the chosen strategy.

1. **Background Information**

Reducing is a strategy to compute large numbers in an equation, especially those where multiplication or division is required. Reducing requires that all numbers in the equation can be divided by the same, easy to remember number, such as 5, 100, or 1,000. Reducing makes it easier to computer equations with mental math. It’s important to remember that in the equations, you have to compute the number used to reduce the equation, too, and combine back with the result to get the final answer.

Example: 800 X 200 = n

* Reduce by 100
* 8 X 2 = n and 100 X 100
* n=16 and 100 x 100 = 10000
* Multiple the two results
* Answer is 16,000

Example: 140 / 20 = n

* Reduce by 10
* 14 / 2 = n and 20 / 20
* n=7 and 20 /20 = 1
* Multiple the two results
* Answer is 7

Sometimes, when multiplying or dividing a large number by a smaller number, you may not be able to reduce both numbers in the equation, but you can factor out the larger number into two smaller numbers to make the mental computation easier.

Example: 800 X 2 = n

* 800 can be factored in 8 and 100
* Reduce to 8 / 2 = n and recall that the answer needs to be multiplied by 100
* n=4
* Multiple the factor of 100
* Answer is 400

1. **Example in Context**

Example:

A farmer is going to plant a 160 acre field to corn this year. The recommended seeding rate for this field is 20,000 seeds per acre. A unit (bag) of seed corn contains 80,000 seeds. Using mental math strategies, how many units of corn seed are needed for the field?

*Answer:*

*This is a two stage computation.*

*In the first stage, find the number of acres one bag of seed can plant.*

*80,000 / 40,000 = n*

*Reduce all numbers by 10,000*

*8 / 4 = n and 10,000 / 10,000*

*n = 2 and 10000 / 10000 = 1*

*Multiple results together*

*2 X 1 = 2 acres per unit of seed*

*In stage two, take the number of acres and divide by the number of acres each unit of seed will plant to find the number of units needed.*

*160 / 2 = n*

*160 can be factored in 16 and 10*

*Reduce to 16 / 2 = n and recall that the answer needs to be multiplied by 10*

*n=8*

*Multiple the factor of 10*

*Answer is 80*

*The farmer will need to purchase 80 units of seed to plant this field*

1. **Guided Practice Exercise**

Example:

A farmer is going to plant an 80 acre field to soybeans this year. The recommended seeding rate for this field is 100,000 seeds per acre. The seed soybeans used by this farmer are large so only 125,000 seeds are present in a 50 pound bag (one unit). Using mental math strategies, how many units of soybean seed are needed for the field?

*Answer:*

*This is a two stage computation.*

*In the first stage, find the number of acres one bag of seed can plant.*

*125,000 / 100,000 = n*

*Reduce all numbers by 100,000*

*1.25 / 1 = n and 100,000 / 100,000*

*n = 1.25 and 100,000 / 100,000 = 1*

*Multiple results together*

*1.25 X 1 = 1.25 acres per unit of seed*

*In stage two, take the number of acres and divide by the number of acres each unit of seed will plant to find the number of units needed.*

*80 / 1.25 = n*

*80 can be factored in 8 and 10*

*Reduce to 8 / 1.25 = n and recall that the answer needs to be multiplied by 10*

*(8 / 1.25 may require estimation strategies or quick written equation to solve)*

*n=6.4*

*Multiple the factor of 10*

*Answer is 64*

*The farmer will need to purchase 64 units of seed to plant this field*

1. **Independent Practice Exercises**

Example:

A farmer is going to plant 2000 acres of corn this year. The recommended seeding rate, on average for the farm, is 32,000 seeds per acre. A unit (bag) of seed corn contains 80,000 seeds. Using mental math strategies, how many units of corn seed are needed for the field?

*Answer:*

*This is a two stage computation.*

*In the first stage, find the number of acres one bag of seed can plant.*

*80,000 / 32,000 = n*

*Reduce all numbers by 10,000*

*8 / 3.2 = n and 10,000 / 10,000*

*(8 / 3.2 may require estimation strategies or quick written equation to solve)*

*n = 2.5 and 10,000 / 10,000 = 1*

*Multiple results together*

*2.5 X 1 = 2.5 acres per unit of seed*

*In stage two, take the number of acres and divide by the number of acres each unit of seed will plant to find the number of units needed.*

*2000 / 2.5 = n*

*2000 can be factored in 20 and 100*

*Reduce to 20 / 2.5 = n and recall that the answer needs to be multiplied by 100*

*(20 / 2.5 may require estimation strategies or quick written equation to solve)*

*n=8*

*Multiple the factor of 100*

*Answer is 800*

*The farmer will need to purchase 800 units of seed to plant this field*

1. **Notes**

As an extension of these exercises, you can have the students find the total cost of seed by using $200 per unit of corn and $300 per unit of soybean seed. This will help students understand the scope of expense incurred by many farmers.